

Research
Paper

Agroforestry practices for crop, soil improvement and economic gain in dry lands of Hyderabad region of Andhra Pradesh

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ABSTRACT

In agroforestry practice for crop improvement in poor and marginal soils indicated that sunflower grown when intercropped in six year old *Hardwickia binata* after stylo recorded higher seed yield (342 kg ha^{-1}) than grown after fallow in *Hardwickia binata* (248 kg ha^{-1}). The total monetary returns from tree and crop were considerably higher when sunflower grown as intercrop in *Hardwickia binata* (Rs 6,593). In thirteen year old *Faidherbia albida* trial during kharif 2001 revealed that the seed yield of maize + soyabean when grown as intercrops in *Faidherbia albida* was markedly increased (29.4 q ha^{-1}) when compared to that of sole cropped maize (16.7 q ha^{-1}). The total monetary returns from the system (Tree + crop) were increased considerably when maize grown as intercrop in trees (Rs 11,276) over maize grown as sole crop (Rs 3,764). The soil physical properties revealed that the bulk density of soil was reduced in surface and subsurface soils in all the tree based cropping systems as compared to fallow (1.61 and 1.68 Mg kg^{-1}) and agricultural lands (1.62 and $1.67 \text{ (Mg kg}^{-1})$). The lowest being in Eucalyptus system (1.38 and 1.62 Mg kg^{-1}) followed by agri-horticulture system. Whereas, water holding capacity and infiltration rate was found maximum in agri-horti system (30 and 30% at $0-15$ and $15-30 \text{ cm}$ and 2.1 cm hr^{-1} at 30 cm depth respectively) and minimum was recorded in fallow land use system at both soil depths (15 and 10% at $0-15$ and $15-30 \text{ cm}$ and 2.1 cm hr^{-1} at $0-30 \text{ cm}$ depth respectively). Regarding nutrient status, the total nitrogen and carbon was more, where soil was covered with tree plantation as compared to fallow and agricultural lands. Maximum total nitrogen (0.076 and 0.071% and total carbon (0.89 and 0.76% at both depths respectively) was resulted in agri-horticultural system followed by silvi pastoral system being 0.067 , 0.064% and 0.72 , 0.70% .

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Key words : Agroforestry, Dry land use system, Soil improvement, *Faidherbia albida*

INTRODUCTION

Arable farming since last several years specially in dry lands has not proved profitable mainly on account of aberrations of monsoons. The marginal, sub marginal farmers of SAT areas who are dependent on sole crop farming are suffering for remunerative returns. This is mainly because of low investment due to risk involved and limited adoption of improved dry land technology. Under such situations, a system of integration of trees with arable crops or pastures/grasses matching the land capability help the farmers of dry regions in imparting stability and providing sustainability to the farming system. Alternate land use system could be possible through

Agroforestry which is need of the hour for mitigating the problems in dry lands. It aims at matching the land capacity in the minimum risk and maximum generation of income through efficient utilization of resources. The main aim of agroforestry in dry lands is to improve the site and to optimize the productivity of agricultural crops as well as forest crops (Young, 1997). Well designed Agroforestry systems can contribute to the improvement of rural welfare through a variety of direct " Production roles " *i.e.* food, fodder, fuel, fiber and small timber etc., as well as through whole range of indirect " Service roles " *i.e.* soil and water conservation, fertility improvement, microclimate amelioration etc.